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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/786,768	03/09/2001	Maurizio Pilu	30990023US	5109

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Hewlett-Packard Company  
Intellectual Property Administration  
P.O. Box 272400  
Fort Collins, CO 80527-2400

EXAMINER

LEE, CHEUKFAN

ART UNIT	PAPER NUMBER
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2622

DATE MAILED: 07/02/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

09/786,768

Applicant(s)

PILU, MAURIZIO

Examiner

Cheukfan Lee

Art Unit

2622

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 09 March 2001.  
2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.  
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-11 is/are pending in the application.  
4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.  
5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.  
6) ☒ Claim(s) 1,2 and 8-10 is/are rejected.  
7) ☒ Claim(s) 3-7 and 11 is/are objected to.  
8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.  
10) ☒ The drawing(s) filed on 09 March 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☒ All b) ☐ Some \* c) ☐ None of:  
1. ☒ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)  
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)  
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date two 1449s.  
4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.  
5) ☐ Notice of Informal Patent Application (PTO-152)  
6) ☐ Other: \_\_\_\_\_.

1. Claims 1-11 are pending. Claims 1 and 2 are independent.
2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1, 2 and 8-10 are rejected under 35 U.S.C. 102(b) as being anticipated by Saund (U.S. Patent No. 5,835,241).

Regarding claim 1 and corresponding method claim 2, Saund discloses an overhead scanning system for scanning or imaging an opened book placed on a support table (12). The open book has a surface that is non-planar and developable. The system comprises a processor (24) linked to an image acquisition system (20) having a (two-dimensional) charge-coupled device (col. 4, lines 60-67) for detecting at least one image of the open book surface, the image having a warp corresponding to the open book surface. The system also comprises a light stripe projection system (20), which contains a laser source, for projecting light onto the open book (col. 5, lines 13-15). The number of light stripes projected includes two or more.

In Saund (Fig. 3), I1 (i.e., i1) is an image of the open book document (10) acquired with the light stripe projector (22) turned on, I2 (i.e., i2) is an image acquired without the projection of the light stripes, T2 is page shape transform determined using I1, and a corrected image I3 (i.e., i3) is formed by de-warping the image i2 using page

shape transform T2 (and also T1 at col. 5, lines 35-67, which is the perspective transform generated using calibration data 30 and to be discussed below) (col. 6, lines 15-63, col. 4, line 66 – col. 6, line 14). T2 meets the claim limitations related to “a first set of points” and “a second set of points” to be discussed below after T1.

In more details of perspective transform T1, T1 is generated using calibration data (30) stored in storage device (28) of processor (24), which is obtained by the system controller (26 in processor 24) invoking the calibration system (14) that uses the calibration object (18). T1 defines an interrelationship between a two-dimensional image coordinate system of the image acquisition system 920) and a world coordinate system in which the book document is represented in three dimensions (col. 5, line 60 – col. 6, line 1).

With regard to T2, page shape transform T2 is generated or determined by page shape transform generator (40) using stored shaped data (34) from storage device (28) which is generated by invoking the light stripe projection system (20) (col. 5, lines 53-57, col. 6, lines 1-14). **Page shape transform T2 defines an interrelationship between the three-dimensional world coordinate system and a page coordinate system which defines an output space in which a page bound document (book document 10) is represented in two dimensions.**

Regarding the claimed “first set of points representing the three-dimensional profile of the non-planar” and “the processor is arranged to fit to the first set of points a second set of points representative of a developable mesh and to use the second set of points to texture-map the image in order to de-warp the image”, the page shape

transform T2 (col. 8, line 40 – col. 9, line 33) defines a relationship between the world coordinate system (53 (X, Y, Z)) and a page coordinate system (54 (x, y)) which defines two-dimensional space which is used to represent a virtual page (52) of the book document (10). The virtual page (52) represent a hard copy rendered by an electronic printing system. From the above, a first set of points is inherently generated representing the three-dimensional profile of the book and is being fit to an inherent second set of points representative of a developable mesh, by the processor (24) using page shape transform T2. The image (i2) obtained without the presence of light stripes inherently gets mapped using the second set of points, producing the virtual page (52 in Fig. 6) representative of an image displayed on a hard copy, which is de-warped, and which is developable by the way. Therefore, Saund meets all claimed limitations.

Regarding claim 8, the non-planar developable surface is a curled book (10).

Regarding claim 9, according to Fig. 6 and based on the discussion for claims 1 and 2 above, it is inherent that the extend of the book document (10) is estimated by fitting a rectangle around extreme points of the first set of points representing the three-dimensional profile of the non-planar surface of the book (10). Thus, the virtual page (52 in Fig. 6) is produced.

Regarding claim 10, the light stripe projection system (22) having the laser source projects a structured light pattern that form separated light stripes across the surface of the book (10) (col. 11, lines 61-63), and the inherent first set of points are generated from the light stripes, i.e., image i1 generated when the light stripe projection system (22) is turned on.

4. Claims 3-7 and 11 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

5. The following is an examiner's statement of reasons for allowance:

Claims 3-7 would be allowable over Saund because Saund does not disclose distorting the inherent mesh the second set of points is fit to the first set of points to the extent that the mesh is no longer developable and relaxing the distorted mesh to a developable state as claimed in claim 3. Claims 4-7 depend upon claim 3, directly or indirectly.

Claim 11 would be allowable over Saund. Though Saund generates two images, one (i1) generated with the light stripe projection system (22) being turned on, and another one (i2) generated without the presence of light stripes, Saund does not disclose taking the difference between the two images, thresholding the difference, counting the stripes across the difference image, and triangulating the image (i2) of the non-planar surface as claimed in claim 11.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Gamache et al. (U.S. Patent No. 5,193,120) discloses a machine vision three-dimensional profiling system.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Cheukfan Lee whose telephone number is (703) 305-4867. The examiner can normally be reached on 9:30 a.m. to 6:00 p.m., Mon-Fri.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward L. Coles can be reached on (703) 305-4712. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Cheukfan Lee  
June 15, 2004

  
*Cheukfan Lee*